

CLAIMS

1. A process for etching a metal or alloy surface which comprises applying an etch-resist ink by ink jet printing to selected areas of the metal or alloy, solidifying the etch-resist ink without the use of actinic light and / or particle beam radiation and then removing the exposed metal or alloy by a chemical etching process wherein the etch-resist ink comprises the components:

A) 60 to 100 parts carrier vehicle comprising one or more components which contain at least one metal chelating group;

B) 0 to 40 parts colorant; and

C) 0 to 5 parts surfactant;

wherein the ink has a viscosity of not greater than 30 cPs (mPa.s) at the firing temperature, all parts are by weight and the total number of parts A)+B)+C) = 100.

2. A process as claimed in claim 1 wherein the metal chelating group(s) are selected from the group consisting of ketoximines; acetaryl amides; hydroxy silanes and alkoxy silanes; aryl or heteroaryl hydroxides; N-containing heterocycles; acid anhydrides;  $\beta$ -diketones,  $\beta$ -keto esters,  $\beta$ -keto aldehydes,  $\beta$ -keto heterocycles; and acid groups.

3. A process as claimed in claim 1 wherein the metal chelating group(s) are selected from the group consisting of imidazoles, benzimidazoles, triazoles, benzotriazoles, thiazoles and isothiazoles.

4. A process as claimed in claim 1 wherein the metal chelating group(s) are selected from the group consisting of  $\beta$ -diketones,  $\beta$ -keto esters,  $\beta$ -keto aldehydes and  $\beta$ -keto heterocycles.

5. A process as claimed in claim 1 wherein the metal chelating group(s) are acid groups.

6. A process as claimed in claim 5 wherein the acid groups are selected from the group consisting of carboxylic acid, phosphoric acid, polyphosphoric acid, phosphonic acid, sulphuric acid and sulphonic acid groups.

7. A process as claimed in claim 5 wherein the acid groups are carboxylic acid groups.

8. A process as claimed in claim 1 wherein the carrier vehicle comprises two or more types of metal chelating groups wherein at least one of the metal chelating groups is an acid group and at least one of the metal chelating groups is not an acid group.

9. A process as claimed in any one of claims 1 to 8 wherein the etch-resist ink is solidified by cooling.

10. A process as claimed in any one of claims 1 to 9 wherein the etch-resist ink is essentially free from volatile organic liquid.

11. A process as claimed in any one of claims 1 to 10 wherein the colorant is a pigment.

12. A process as claimed in any one of claims 1 to 11 wherein the colorant is blue.

13. A process as claimed in any one of claims 1 to 12 wherein the etch-resist ink has been filtered through a filter having a pore size of 1 micron.

14. A process as claimed in any one of claims 1 to 13 wherein the etch-resist ink has a surface tension of from 20 to 40 mN/m at a temperature of 25°C.

15. A process as claimed in any one of claims 1 to 14 wherein the viscosity of the etch-resist ink is from 8 to 15 cPs (mPa.s) at the firing temperature.

16. A process as claimed in any one of claims 1 to 15 wherein the firing temperature is from 10 to 150°C.

17. A process as claimed in claim 1 wherein at least one component of the carrier vehicle contains at least one acid metal chelating group and the etch-resist ink has an acid value from 40 to 150mg KOH/g.

18. A process as claimed in any one of claims 1 to 17 wherein the metal or alloy is iron or a ferro alloy.

19. A process as claimed in claim 1 wherein the carrier vehicle comprises a volatile liquid and a resin.

20. A process as claimed in claim 19 wherein the volatile liquid is free from water.

21. A process as claimed in claim 1 wherein the carrier vehicle comprises a wax or polyamide polymer or a mixture thereof.

22. A process as claimed in claim 1 wherein the carrier vehicle comprises at least one thermally reactive liquid monomer.

23. A process as claimed in claim 22 wherein the thermally reactive liquid monomer contains an activated olefinic group and the carrier vehicle additionally comprises a thermal radical initiator.

5 24. A process as claimed in any one of the preceding claims wherein the etching fully penetrates the metal or alloy.

25. A process as claimed in any one of claims 1 to 24 wherein the solidified etch-resist is removed after etching.

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26. A process as claimed in claim 25 wherein the solidified etch-resist is removed by treatment with an alkaline medium.

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27. An etched metal or alloy partially coated with a solidified etch-resist made by the process as claimed in any one of claims 1 to 24.

28. An etched metal or alloy made by the process as claimed in claim 25 or claim 26.

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29. A grid, a filter, a graticule, a mesh, a light chopper disc, a heat sink plate, a heater element, a screen, colour TV mask, a diaphragm, a shim, a gasket, a washer, a spring, a link, a probe, a magnetic recording head, a circuit lead frame, an encoder disc, an item of jewellery, a rule, a scale, a clutch plate, an emitter contact, a micro reactor, a suspension lead, an ink jet nozzle plate, a stencil, a razor foil, a bearing, an edge filter, a logo, a nameplate, a decorative plaque, an instrument case, a box, an enclosure and a potentiometer case having a chemically etched surface pattern or design made by a process as claimed in any one of claims 1 to 26.

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